Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-122. (canceled)

123. (Currently amended) An apparatus for detecting a clinically-relevant feature ~~features~~ of a gastrointestinal (GI) tract of a subject, comprising:

an oral contrast agent consisting essentially of a stable and non-radioactive isotope, adapted to be administered to the subject;

a capsule adapted to be swallowed by the subject, said capsule including:

at least one radiation source emitting X-ray or gamma radiation having an energy of at least 10 keV;

at least one radiation detector comprising at least one collimator configured to detect in a first energy window collimated X-ray fluorescence radiation from the X-ray contrast agent composition excited by the emitted radiation, and to detect in a second energy window Compton-backscattered radiation from the X-ray contrast agent and the wall of the GI tract produced in response to the emitted radiation; and

a control unit configured to analyze data regarding the detected X-ray fluorescence radiation and Compton-backscattered radiation to identify a distance between the capsule and a wall of the GI tract,

said control unit further configured to compute a ratio between the Compton backscattered radiation and the X-ray fluorescence radiation signals for distinguishing between gas in the GI tract and the clinically-relevant feature.

124. (Previously presented) The apparatus according to claim 123, wherein the contrast agent composition comprises an agent having a high Z adapted to be swallowed by the subject.

125. (Previously presented) The apparatus according to claim 123, wherein the radiation source comprises a radioisotope.

126. (Previously presented) The apparatus according to claim 123, wherein the radiation source comprises at least one collimator which collimates the radiation emitted by the radiation source.

127–130. (Canceled)

131. (Currently amended) The apparatus according to claim 123, wherein the ~~useful information~~ clinically-relevant feature includes an estimate of a distance from a site of the capsule to a wall of the GI tract.

132. (Canceled)

133. (Previously presented) The apparatus according to claim 131, wherein the distance is estimated from an intensity measurement of the Compton backscattered radiation.

134. (Previously presented) The apparatus according to claim 131, wherein the distance is estimated from an intensity measurement of the X-ray fluorescence (XRF) radiation generated responsive to the emitted radiation.

135. (Previously presented) The apparatus according to claim 123, wherein the radiation source emits the radiation from the capsule only during a portion of a time that the capsule is in the GI tract.

136. (Previously presented) The apparatus according to claim 135, wherein the capsule comprises a sensor, adapted to sense a parameter indicative of possible imminent motion of the capsule in the GI tract, and wherein the radiation source emits the radiation in response to sensing the parameter by the sensor.

137. (Currently amended) The apparatus according to claim 140, wherein the capsule comprises an actuator adapted to move at least one of the radiation source and the shield, such that the radiation shield does not block the radiation emitted from the radiation source during the portion of the time.

138. (Previously presented) The apparatus according to claim 123, wherein the capsule comprises an inflatable balloon, adapted to inflate around the capsule.

139. (Previously presented) The apparatus according to claim 123, wherein the at least one radiation detector comprises a plurality of radiation detectors, arranged to detect radiation arriving from a plurality of respective detection directions.

140. (Previously presented) The apparatus according claim 123, wherein the capsule comprises at least one radiation shield.

141. (Previously presented) The apparatus according to claim 140, wherein the at least one radiation shield is configured to prevent radiation from being emitted from the radiation source in directions other than a single confined solid sector relative to a sphere surrounding the capsule.

142. (Previously presented) The apparatus according to claim 123, wherein the clinically relevant feature includes a pathological abnormality of the GI tract.

143. (Previously presented) The apparatus according to claim 142, wherein the pathological abnormality includes a polyp.

144. (Previously presented) The apparatus according to claim 123, wherein the control unit is adapted to detect that the capsule has reached an area of clinical interest within the GI tract.

145. (Canceled)

146. (Currently amended) The apparatus according to claim 123 ~~145~~, wherein the control unit includes means for activating the radiation detector and electronic circuitry upon movement of the colon wall.

147. (Canceled)

148. (Previously presented) The apparatus according to claim 144, wherein the capsule comprises a pressure sensor, and wherein the control unit detects that the capsule has reached the area responsively to a change in pressure detected by the pressure sensor.

149–151. (Canceled)

152. (Previously presented) The apparatus according to claim 123, wherein the capsule comprises at least one extending element, which, when extended, maintains the capsule at least a certain distance from a wall of the GI tract.

153. (Previously presented) The apparatus according to claim 123, wherein the capsule comprises at least one extending element, which, when extended, orients a long axis of the capsule generally parallel to a longitudinal axis of the GI tract.

154. (Previously presented) The apparatus according to claim 153, wherein the extending element comprises an expandable flexible chamber, wherein the flexible chamber comprises a super-absorbent hydrogel, and wherein the flexible chamber expands when the hydrogel absorbs liquids from the GI tract.

155. (Previously presented) A method for detecting clinically-relevant features of a gastrointestinal (GI) tract of a subject, comprising:

orally administering to a subject a radiopaque X-ray contrast agent composition consisting essentially of a stable, non-radioactive isotope;

orally administering to a subject a capsule emitting X-ray or gamma radiation having an energy of at least 10 keV;

measuring, from within the GI tract, concurrently in a first energy window a first radiation signal generated responsively to the emitted X-ray or gamma radiation, said measured first radiation signal representing collimated Compton-backscattered radiation, and in a second energy window a second radiation signal representing X-ray fluorescence (XRF) radiation from the X-ray contrast agent; and

computing a ratio between the first radiation signal and the second radiation signal for distinguishing between gas in the GI tract and a clinically-relevant feature.

156. (Previously presented) The apparatus according to claim 123, wherein X-ray contrast agent composition comprises a composition selected from a barium sulfate-based compound, an iodine-based compound, and a gadolinium-based compound.

157. (Previously presented) The apparatus according to claim 123, wherein X-ray contrast agent composition comprises a composition selected from Tantalum, Gadolinium, Thorium, Bismuth, and compounds thereof.

158. (Previously presented) The apparatus according to claim 141, wherein the at least one radiation detector is arranged for detection of Compton-backscattered radiation at an angle of 180° ± 30° relative to the angle defined by the solid sector.

159. (Previously presented) The method of claim 155, wherein the clinically-relevant feature of the GI tract comprises a polyp or another comparable anatomical abnormality, further comprising identifying the polyp or anatomical abnormality from a decrease in the second radiation signal from the XRF radiation accompanied by an increase in the first radiation signal from the Compton-backscattered radiation.

160. (Previously presented) The method of claim 155, further computing a ratio between the measured first radiation signal from Compton-scattered radiation

and the measured second radiation signal from XRF radiation, and differentiating between gas pockets and polyps based on the computed ratio.

161. (Previously presented) A capsule, adapted to be swallowed by a subject, for detecting clinically-relevant features of a gastrointestinal (GI) tract of a subject, comprising:

at least one radiation source emitting X-ray or gamma radiation having an energy of at least 10 keV;

at least one radiation detector comprising at least one collimator configured to detect a first energy window collimated X-ray fluorescence radiation from the X-ray contrast agent composition excited by the emitted radiation, and to detect a second energy window Compton-backscattered radiation from the X-ray contrast agent and the wall of the GI tract produced in response to the emitted radiation; and

a control unit configured to compute a ratio between the Compton-backscattered radiation and the X-ray fluorescence radiation signals for distinguishing between gas in the GI tract and a clinically-relevant feature.